

THE MINERAL INDUSTRY OF

AZERBAIJAN

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For over one century, Azerbaijan has been an oil and gas producer and has had a petroleum refining industry. It is also a producer of iron ore, alunite, alumina and aluminum, copper and molybdenum ore, lead and zinc ore, and industrial minerals, including iodine and bromine, clays, gypsum, limestone, marble, decorative building stone, sand and gravel, and precious and semiprecious stones.

The country's most significant reserves in terms of value are its oil reserves; a number of foreign firms are involved in projects to develop these reserves. Azerbaijan also has numerous other mineral resources, including metals, such as aluminum in alunite, arsenic, chromite, cobalt, copper, iron ore, lead and zinc, manganese, mercury, molybdenum, and tungsten; industrial minerals, such as barite, clays, refractory-grade dolomite, gypsum, kaolin, limestone, pyrite, salt, and zeolites, and semiprecious stones, including amethyst, andalusite, and garnet, as well as a range of building materials.

The country has 350 nonfuel mineral deposits with resources that are termed "explored" on the basis of the reserve classification system used in the former Soviet Union (FSU): 168 of these deposits were being developed. At the conference in Istanbul on June 16 to 18, 1998, entitled "Central Asia, Balkans and Caucasus Countries: Mining, Investment, and Business Opportunities Symposium" sponsored by the Multilateral Investment Guarantee Agency, the Organization for Economic Cooperation and Development, and the Turkish International Cooperation Agency, the Chairman of the Azerbaijan State Committee for Geology and Mineral Resources listed major undeveloped and developed deposits with explored resources for which the country was seeking to attract foreign investors to develop undeveloped deposits and to expand operations at developed deposits.

These proposed investment opportunities included developing the Filizchaisky group of deposits, which contains copper, lead, zinc, and byproducts, including gold and silver; establishing an enterprise to process cobalt-bearing magnetite ores and to extract cobalt from tailings from the Dashkesansky group of deposits; producing iron ore pellets from reserves of magnetite ores in the Dashkesansky group of deposits; constructing a plant to produce bentonite powder for ferrous metallurgy from reserves at the Dashalakhlynsky deposit; developing the Karadagsk copper porphyry deposit and establishing a company to produce copper and blue vitrol; establishing a joint venture to mine copper-bearing pyritic ores from the Mazymchaisky deposit; establishing a glass production plant using raw material from the Negramsky dolomite deposit; establishing a plant to produce soda ash using reserves of dolomite and rock salt from the Nakhichevan autonomous district; establishing a joint venture to develop the

Aidagsky zeolite deposit; constructing a plant to treat bromine-iodine waters to produce finished products; developing a company to produce tiles from decorative stones; and establishing a joint venture to produce items using precious and semiprecious stones (Shekinsky, 1998).

In 1997, for the second consecutive year, Azerbaijan reported an increase in gross domestic product (GDP), which increased by 5.8% compared with that of 1996. Industrial output increased by 0.3%. Still, GDP in 1997 was only 45% of that in 1991, and industrial output was only 36%. Unrecorded economic activity had been estimated to account for about 25% of the country's economic activity, making any published GDP figures uncertain (Interfax Statistical Report, 1998b). In 1997, Azerbaijan's chief export was mineral products, which composed more than 60% of the total value of exports (Interfax Statistical Report, 1998a). The country traditionally exported only refinery products, and in 1997, only minimal exports of crude oil were reported by any of the international consortia of which the State Oil Company of Azerbaijan (Socar) is a member.

Reported production figures for 1997 show increases and decreases in nonfuel minerals production compared with those of 1996 and a slight decrease in mineral fuel production. (*See table 1.*) According to the president of the Metallurgiya holding company, the metals industry employed about 10,000 people but was working at just 10% to 15% of capacity. The president of Metallurgiya also stated that the industry was badly in need of foreign investment, particularly in the aluminum production sector.

Azerbaijan produced alumina from bauxite and domestic alunite ore mined from open pits. About 6 metric tons (t) of alunite ore is normally required to produce 1 t of alumina. Alunite processing, which is very energy-intensive compared with bauxite processing, was started under the former Soviet system that made mineral production a priority irrespective of production costs. Nevertheless, the 450,000-metric-ton-per-year (t/yr) capacity Gyandzha alumina refinery, originally built to process alunite, was expanded in the late 1970's to process imported bauxite rather than alunite. Only one section at Gyandzha, with a capacity to produce 100,000 t/yr of alumina, processed alunite. The alumina from Gyandzha was shipped to the Sumgait aluminum smelter in Azerbaijan and the Tajik aluminum smelter in Tajikistan. The Sumgait smelter had the capacity to produce about 60,000 t/yr of aluminum. According to the president of Metallurgiya, the revival of the aluminum industry would require full integration of processes from the mining of alunite through the smelting of aluminum (Interfax Mining and Metals Report, 1998b).

Azerbaijan did not begin a program of rapid privatization until

mid-1996, and the privatization of medium- and large-scale enterprises did not begin until mid-1997. A large number of enterprises in the mineral sector, including those producing cement, petrochemicals, and oil and gas, were classified as strategic enterprises and could be privatized only by a presidential decree (United States-Azerbaijan Chamber of Commerce, 1998, p. 27).

Such a decree was issued in early 1998 to privatize the metallurgical enterprises that formed the Metallurgiya holding company. These enterprises included the Azerboru association (formerly the Sumgait steel pipe plant); the Sumgait nonferrous metals plant, Sumgaitvetmet; the Gyandzha Glinozem (alumina) production association; and the Zaglik alunite mines. The enterprises will be tendered, and foreign investors will be allowed to bid. In a separate clause, the contract that allowed the Trans World Corp. (TWC) to manage the Glinozem enterprise was repealed. The management contract for Glinozem was actually dissolved at the start of 1998 by TWC, which stated that it had too many problems trying to sell the sulfuric acid obtained as a byproduct from alunite processing (Interfax Mining and Metals Report, 1998b).

Between August 1996, when Gyandzha was signed over to TWC, and December 1997, the plant was in operation only 75 days. Following the termination of the TWC contract, the former management was reinstated. Gyandzha employed 2,800 people and, besides alumina, had the capacity to produce 350,000 t/yr of sulfuric acid and 115,000 t/yr of mineral fertilizers. Production peaked near capacity in 1987-88, but has since fallen to about 20% of capacity (Interfax Mining and Metals Report, 1998a).

Azerbaijan was engaged in an effort to develop its gold resources. The Azerbaijan Geology Department forecast the country's total gold reserves to be 1,500 t, practically none of which has been mined. The Government of Azerbaijan and the RV Investment Group Services LLS, a consortium from the United States, signed a contract for the exploration and development of nine gold lode deposits in the Nakhichevan autonomous district and the Angelan, the Kebabzhar, the Kedabak and the Tauz regions of Azerbaijan. The consortium will finance the exploration and development and retain a 49% interest, and the Azerbaijanian company Azergyzyll will own 51%. During the first 3 years, the project would explore the nine deposits, which are estimated to contain 400 t of gold, 2,500 t of silver, and 15 million metric tons (Mt) of copper ore. These estimates included resources in territories for which there was an ownership dispute with Armenia. The Kelbadzhar and the Zangelan districts were claimed by Armenia and host the Kyazylbulag, the Suitlin (called Zod by the Armenians), and the Vekdznelin gold lodes. Armenia already signed a contract with Global Gold of the United Kingdom to develop Zod. Azerbaijan, however, claimed that 73% of this deposit was on Azerbaijanian territory (Interfax Mining and Metals Report, 1997).

Azerbaijan's major industry was oil production. Oil production peaked at about 500,000 barrels per day (bbl/d) during World War II, then fell significantly after the 1950's as the Soviet Union redirected oil development resources elsewhere. Production also declined after Azerbaijan became independent in 1991 and fell slightly in 1997 compared with 1996. Oil production, however, began at the country's first production sharing agreement (PSA)

project at Chirag. Plans for 1998 called for oil production to remain at about the 9-Mt level (Interfax Petroleum Report, 1998b).

Azerbaijan's oil production occurred primarily offshore in the Caspian Sea. One field, Guneshli, 60 miles off the Azeri coast, accounted for more than one-half of the country's oil production. All crude oil produced in Azerbaijan was refined at Azerbaijan's two domestic refineries in Baku; only petroleum products had been exported (U.S. Department of Energy, November 1997, Azerbaijan, accessed May 5, 1998, at URL <http://www.eia.doe.gov/emeu/cabs/azerbaijan.html>).

With the planned development of new oilfields in the Caspian Sea through joint ventures and PSA's, Azerbaijan's oil production should increase to levels far exceeding its former peak production within the next 10 to 15 years. As of 1997, Azerbaijan had signed nine oil development PSA's, and 20 companies from 12 countries were engaged in offshore development. The Azerbaijan signatory to the PSA's was Socar (State Oil Company of the Azerbaijan Republic) (United States-Azerbaijan Chamber of Commerce, 1998, p. 54).

Seven of the foreign companies engaged in offshore development were from the United States (Amoco, Arco, Chevron, Exxon, Mobil, Pennzoil, and Unocal). The nine agreements were as follows: The first project, the Azerbaijan International Operating Company (AIOC), was formed in September 1994, in what was described as "the deal of the century," by an international consortium to develop three fields, the Azeri, the Chirag, and the deep-water portions of Guneshli, with total reserves estimated to be 3 billion to 5 billion barrels. The AIOC included the following companies with their representative stakes: British Petroleum (17.1%); Amoco (17%); Socar (10%); Lukoil (Russia, 10%); Unocal (10%); Statoil (Norway, 8.6%); Exxon (8%); TPAO (Turkey, 6.8%); Pennzoil (4.8%); Itochu (Japan, 4%); Ramco (United Kingdom, 2.1%), and Delta-Nimir (Saudi Arabia, 1.6%) (U.S. Department of Energy, November 1997, Azerbaijan, accessed May 5, 1998, at URL <http://www.eia.doe.gov/emeu/cabs/azerbaijan.html>).

Initial oil production from the AIOC project, termed "early oil", would be produced from an existing platform at the Chirag field and was projected to reach between 80,000 and 100,000 bbl/d by yearend 1997. The AIOC planned to export this early oil via two pipelines—a northern route through Russia and a western route through Georgia. Each line will have an initial capacity of 100,000 bbl/d and will have the ability to at least double that capacity with additional pumping facilities. The northern route uses an existing pipeline through Chechnya to the Russian Black Sea port of Novorossisk. This northern pipeline began pumping its first flow on November 12, 1997, when the President of Azerbaijan opened the valve on the Chirag-1 platform in the Caspian Sea. The main flows of oil, however, will not begin for another 7 years (Interfax Petroleum Report, 1997c).

In 1997, two AIOC project wells drilled from the Chirag-1 platform at the Chirag field went into production with the second coming on-stream in December. In 1998, a total of six wells are to be drilled from Chirag-1, which will increase extraction, as well as shipments through Russia, by the end of 1998 (Interfax Petroleum Report, 1997d).

The western route, scheduled for completion by yearend 1998,

will require constructing a new pipeline from Baku to Georgia, upgrading and refurbishing an existing pipeline from near Tbilisi to the Black Sea coast, and building a new oil terminal at Supsa in Georgia. Reporting in April 1998 indicates that the pipeline route to Supsa will not be completed in 1998 (Interfax Petroleum Report, 1998c).

The AIOC expected production to peak at about 800,000 bbl/d within the next 15 years. This will require the building of a main export pipeline with a capacity of 1 million barrels per day. Several options for routes were under consideration by the Azerbaijan Government in 1997, including pipelines from Baku to Ceyhan (Turkey), Baku to Supsa, and Baku to Novorosiisk. A final decision was not expected until mid-1999 (U.S. Department of Energy, November 1997, Azerbaijan, accessed May 5, 1998, at URL <http://www.eia.doe.gov/emeu/cabs/azerbaijan.html>).

The second project, signed in November 1995, was the Caspian International Operating Company (CIOC) to develop the 900-million-barrel Karabakh field. CIOC stakeholders included: the Lukoil/Agip joint venture LukAgip (50%), Pennzoil (30%), Lukoil (7.5%), Socar (7.5%), and Agip (5%) (U.S. Department of Energy, November 1997, Azerbaijan, accessed May 5, 1998, at URL <http://www.eia.doe.gov/emeu/cabs/azerbaijan.html>).

The third project, signed in December 1996, was the Shak-Deniz project, which has 700 million barrels of oil, as well as large gas resources. Consortium members included British Petroleum (25.5%), Statoil (25.5%), Lukoil (10%), Elf Aquitaine (France, 10%), Socar (10%), the National Iranian Oil Company (10%), and TPAO (9%). U.S. firms were absent because of Iranian participation (U.S. Department of Energy, November 1997, Azerbaijan, accessed May 5, 1998, at URL <http://www.eia.doe.gov/emeu/cabs/azerbaijan.html>).

The fourth project, also signed in December 1996, was the North Aspheron Operating Company venture. The consortium was granted the right to explore a block containing the Ashrafi and the Dan Ulduzu oilfields. Consortium members were Amoco (30%), Unocal (25.5%), Itochu (20%), Socar (20%), and Delta (Saudi Arabia, 4.5%) (U.S. Department of Energy, November 1997, [Azerbaijan], accessed May 5, 1998, at URL <http://www.eia.doe.gov/emeu/cabs/azerbaijan.html>).

The fifth project, signed in January 1997, was for development of the Lenkoran-Deniz and the Talysh-Deniz fields. Stakeholders were Elf Aquitaine (40%), Socar (25%), Total (France, 10%), OIEC (Iran, 10%), Deminex (Germany, 10%), and Petrofina (Belgium, 5%) (U.S. Department of Energy, November 1997, Azerbaijan, accessed May 5, 1998, at URL <http://www.eia.doe.gov/emeu/cabs/azerbaijan.html>).

In August, the President of Azerbaijan visited the United States and signed three agreements, bringing the total to eight agreements. Agreements were signed for the South Aspheron field with Chevron (30%), Total (20%), and Socar (50%); for the Nakhichevan field with Exxon (50%) and Socar (50%); and for the Aegis field with Mobil (50%) and Socar (50%). Negotiations are continued for other fields (United States-Azerbaijan Chamber of Commerce, 1998, p.54-55).

In July, the Azerbaijan Parliament ratified a ninth PSA between Lukoil (60%) and Socar (40%) for exploration and development of the D-222 block in the Caspian with an exploration period set for 4 years with two wells to be drilled and provisions for a 2-year

extension of the period with two more wells to be drilled (Interfax Petroleum Report, 1997b).

In February 1998, the Atlantic Richfield Company of the United States joined the project to develop D-222 as Lukoil officially transferred its 60% stake to Lukarco, a joint venture set up by the two companies (Interfax Petroleum Report, 1998a). Also, Agip won a 25% interest in a tender to explore and develop the Kyurdashi block in the Azerbaijanian sector of the Caspian Sea. Socar will retain a 50% stake, and the remaining 25% stake was as yet unassigned (Interfax Petroleum Report, 1997a).

A potential complication in Azerbaijan's plans for developing its Caspian Sea resources was the uncertainty regarding the legal status of the territorial rights of nations bordering its shores (Iran, Kazakhstan, Russia, and Turkmenistan). A debate took place among Caspian region states over how the Caspian Sea should be treated under international law. Hydrocarbon development has been slowed by legal questions that concern whether development rights are to be governed by treaties signed between the former Soviet Union and Iran that did not establish seabed boundaries or discuss oil and gas exploration and whether the Caspian is a body of water affected by the Law of the Sea. Generally, inland lakes are not covered by this law. If the Law of the Sea convention were applied to the Caspian Sea, then full maritime boundaries of the five littoral states bordering it would be established on the basis of the equidistant division of the sea and its undersea resources into national sectors. If the Law were not applied, then the Caspian and its resources could be developed jointly by the littoral states (U.S. Department of Energy, November 1997, Azerbaijan, accessed May 5, 1998, at URL <http://www.eia.doe.gov/emeu/cabs/azerbaijan.html>).

Russia took the position that neither the Law of the Sea nor its precedents apply because the Caspian is an enclosed sea. In December 1996, Russia had called for joint navigation rights, joint management of fisheries and environmental protection, the establishment of an interstate committee of all boundary states to license exploration in a joint-use zone in the center of the Caspian beyond a 45-nautical-mile exclusive national zone, and joint cooperation of these states to exploit these resources. Iran agreed with Russia's position that the regional treaties signed in 1921 and 1940 were valid, implying that all Caspian littoral states must approve any offshore oil developments (U.S. Department of Energy, November 1997, Azerbaijan, accessed May 5, 1998, at URL <http://www.eia.doe.gov/emeu/cabs/azerbaijan.html>).

Azerbaijan rejected this view, claiming that official boundaries within the Caspian for the FSU had been formalized under the Soviet Union. Azerbaijan also called for the Law of the Sea to be applied and advocated the establishment of maritime boundaries for national sectors on the basis of the equidistant division of the sea. Boundaries thus would follow those that had been established and recognized under the Soviet Union to delineate sectors for oil exploration and development for the former republics.

Kazakhstan supported Azerbaijan's position regarding the establishment of national sectors. Turkmenistan, whose position has been evolving, initially supported Russia's proposal for the 45-nautical-mile zone for each littoral state proposed at a November 1996 meeting in Ashgabat of the foreign ministers from the five littoral states. It claimed control of oil-fields beyond

the 45-mile zone in what Turkmenistan considers to be its territorial waters, according to the division of the Caspian among the littoral states. The change in Turkmenistan's position arose in the context of a dispute with Azerbaijan over a field called Kyapaz by Azerbaijan and Serdar by Turkmenistan. In July, Azerbaijan reached a preliminary agreement to develop this field, but in September, Turkmenistan laid claim to it by including it as part of its Block 30 licensing. The dispute with Turkmenistan revolved around where to draw the median boundary line in the Caspian to delineate Azerbaijan's territory from that of Turkmenistan (U.S. Department of Energy, November 1997, Azerbaijan, accessed May 5, 1998, at URL <http://www.eia.doe.gov/emeu/cabs/azerbaijan.html>).

Russia's position on the Caspian Sea also seemed to be evolving. In July 1998, the Presidents of Russia and Kazakhstan signed an agreement dividing the northern part of the Caspian seabed into separate national sectors. For the first time, Russia recognized a bordering state's claim to offshore oil resources; this could be a harbinger of a resolution to the issue of the ownership of offshore seabed resources in the Caspian. Russia, however, did not relinquish its rights regarding use of the Caspian Sea, including the laying of pipelines (Financial Times, 1998).

Natural gas production also decreased in 1997 by more than 5% compared with that of 1996. In 1998, gas production is expected to rise slightly to 6.19 billion cubic meters (Interfax Petroleum Report, 1998b). In the past, Azerbaijan had imported natural gas from Russia, Turkmenistan, and Iran to meet its domestic demand. To reduce and eliminate eventually the need to import gas, Azerbaijan planned to develop new gasfields in the Caspian Sea that could make Azerbaijan self-sufficient in gas within 5 years. Increased oil production in the Caspian was also expected to increase gas production as most of Azerbaijan's natural gas production now comes from associated gas from offshore oilfields. Additional gas production could also come from the recently discovered offshore Nakhichevan field, with its estimated 900 billion cubic feet of natural gas reserves. Azerbaijan was also boosting natural gas production by reducing flaring and using existing casing head gas. As a result, gas production could increase by as much as 1 trillion cubic feet per year by the end of the next decade, and Azerbaijan could become a net exporter of natural gas to its neighbors (U.S. Department of Energy, November 1997, Azerbaijan, accessed May 5, 1998, at URL <http://www.eia.doe.gov/emeu/cabs/azerbaijan.html>).

Azerbaijan's oil and gas production sector has great economic potential. By 2010, total investment in the oil and gas sector may

be \$23 billion (U.S. Department of Commerce, 1998 Country Commercial Guide for Azerbaijan, accessed April 6, 1998, at URL <http://www.itaiep.doc.gov/bisnis/bisnis.html>). Azerbaijan signed nine PSA's that provide a solid investment foundation for the oil sector of the economy. Although no official estimates exist for the country's total reserves, industry experts suggested that Caspian reserves could approach those of the North Sea, and virtually every major oil company in the world has taken an active interest in Azerbaijan. It appears that reserves may not be as large as initially anticipated, and there could be a reevaluation of pipeline routes and other development activities. The country also was concerned that it not rely solely on oil development, but instead achieve balanced development, and for that reason, was making efforts to revive its other industries, including its mining and metallurgical industries.

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TABLE 1
REPORTED MINERAL PRODUCTION FOR AZERBAIJAN

(Metric tons) unless otherwise specified

Commodity	1996	1997
Aluminum	812	4,717
Caustic soda	33,000	23,000
Cement	223,000	314,700
Fertilizers	1,900	5,400
Natural gas	thousand cubic meters 6,304,000	5,963,900
Petroleum, crude	9,100,300	9,027,000
Steel, crude	2,725	24,607
Rolled	2,000	16,400
Pipes	3,100	13,000
Sulfuric acid	31,000	52,500

Source: United States-Azerbaijan Chamber of Commerce, Investment Guide to Azerbaijan, 1998, p.71; Interfax Statistical Report, v. VII, issue 13, March 20-27, 1998, p. 10; Interfax Statistical Report, v. VI, issue 8, February 14-21, 1997, p. 13-16.

TABLE 2
AZERBAIJAN: STRUCTURE OF THE NONFUEL MINERAL INDUSTRY IN 1997 1/

(Metric tons unless otherwise specified)

Commodity	Major operating companies	Location of main facilities	Annual capacity e/
Aluminum	Sumgait smelter	Sumgait	50,000.
Alumina	Gyandzha refinery	Ganca (formely Gyandzha)	450,000.
Alunite ore	Zaglik alunite mining directorate	Zaylik (formerly Zaglik)	600,000.
Cement	Karadag cement plant	Karadag	1,000,000 (total for both plants).
Do.	Tauz cement plant	Tovuz (formerly Tauz)	
Iodine and bromine	Baku, Karadag, Neftechala plants	Process oil well brines at plants in Baku, Karadag, and Neftechala	30,000 bromine, 100 iodine.
Iron ore, marketable	Dashkesan Mining Directorate	Dashkesan region	1,000,000.
Steel, pipes	Azerbaijan tube and pipe works (Azerboru)	Sumgait	800,000 (crude steel). 700,000 (rolled steel). 540,000 (pipe, tubes).

e/ Estimated.

1/ For the structure of the fuel industry, please refer to the text which discusses new developments and restructuring of the oil and gas sectors.